Mayor and Council - We have received the following response from Rick Wooten of the NCGS concerning landslide slope and geotech analysis. Basically, the response says our staff proposal for geotech is reasonable. Once we have Buncombe-specific info, we can make adjustments as needed to the ordinance.

Please advise if you have any questions.

Scott Shuford

-----Original Message-----
From: Rick Wooten [mailto:Rick.Wooten@ncmail.net]
Sent: Monday, April 30, 2007 6:11 PM
To: Scott Shuford
Cc: Kenneth B. Taylor
Subject: Re: Slope development

Scott,

Thanks for you kind words. It has been our pleasure to assist you.

Two charts for your reference are attached to help address your question concerning the proposed threshold of 40% for slopes that would to require a geotechnical stability analysis. The attached charts show the number of landslides that have occurred at various slope angles (one plot shows slope in percent, the other in degrees) throughout western North Carolina. The total number of landslides used for this analysis is 330. Although there are many more landslide entries in our database, these charts represent the locations where the original, undisturbed (original) slope angle was measured by NCGS staff during site visits. The frequency of slope failures begins to rise abruptly between slopes of 20^o and 25^o (36-47%), and appears to be the slope threshold where we begin to expect unstable slope or landslides to occur in certain situations. 40% (or 22 degrees) is a reasonable reference point within this range of slope angles. Work has not yet been completed in Buncombe County; therefore, we do not have statistics specifically for the Asheville and Buncombe County area. Once the landslide hazard mapping for Buncombe County is complete, we may find that the slope threshold for instability is somewhat different. Any differences would be reflected in our landslide hazard maps.

The Stability Index Map that the NCGS will produce is based on a mathematical equation that utilizes many factors to predict the stability of the slope. These factors include soil strength parameters, surface and groundwater conditions, and slope. Of all the factors, the model is most sensitive to the slope angle. Therefore, the modeling relies heavily on the slope angle as a predictor for landslides.

Please understand though, that the Stability Index Map is not site specific and not intended to be the sole indicator of stability at the parcel scale. A limiting factor is the resolution (20-foot) of the LiDAR digital elevation model used to produce the Stability Index Map and derive slope angle. The LiDAR digital elevation model is necessary to create the maps, but more detailed (i.e. greater resolution) data are not available at this time. For these reasons an on-the-ground, site-specific evaluation by qualified individuals is necessary to assess the stability at the parcel scale and to accurately calculate slope

angle at a specific site location.

One situation to be aware of is modifications to slopes flatter than 40%. If poor cut-and-fill construction methods are used on slopes less than 40% to create high cuts and big fills, the potential for landslides may increase. It appears, however, that the proposed ordinance provides standards for cut-and-fill construction.

I hope this information is helpful. Please feel free to contact me with any questions, or if we can provide additional information.

Best Regards,
Rick

>
> Scott Shuford wrote:
>
> > Rick -
> >
> > First of all, thanks again for all your assistance on the slope
> > development issues. It has been great to work with you and your
> > talented, helpful staff.
> >
> > Second, I have two specific questions that I would appreciate your
> > response to. The City staff has proposed the following threshold for
> > the requirement of a geotechnical analysis prior to a building permit.
> >
> > /Geotechnical analysis required./ Development in steep slope areas
> > having an existing grade of 40% or greater or on properties located in
> > areas designated as High Hazard or Moderate Hazard on the Buncombe
> > County Slope Stability Index Map prepared by the North Carolina
> > Geological Survey shall be required to undergo geotechnical analysis
> > by a NC registered professional engineer to determine the stability of
> > the underlying geology and soils to support the proposed development.
> > The geotechnical analysis report shall be required to be submitted
> > prior to the issuance of a building permit. If a geotechnical analysis
> > has been performed for subdivision approval that includes building pad
> > analysis for the individual lots, it is unnecessary to submit a new
> > analysis for each lot, provided the location of structures on each lot
> > does not change by more than 20 feet in any one direction.
> >
> > * The questions are:
> > Do you feel the threshold proposed below represents a reasonably
> > prudent balancing of risk and cost for requiring a geotechnical
> > analysis?
> > * If not, can you provide any suggestions?
> >
> > Thank you for your attention to these questions. If I can provide any
> > supplemental information, please contact me.
> >
> > Sincerely,
> > Scott Shuford, AICP
> > Planning and Development Director